

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

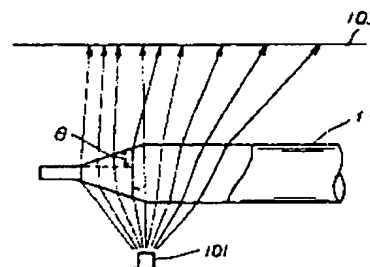
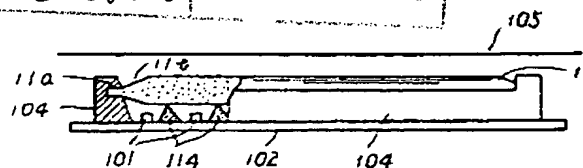
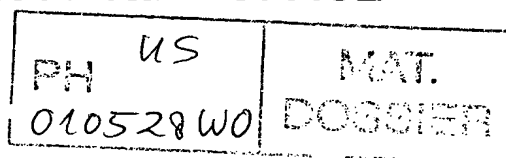
PUBLICATION NUMBER : 63074025  
PUBLICATION DATE : 04-04-88  
APPLICATION DATE : 18-09-86  
APPLICATION NUMBER : 61217905

APPLICANT : TOSHIBA CORP;

INVENTOR : TANAKA TOSHIAKI;

INT.CL. : G02B 27/00 G03G 15/04 H01L 33/00

TITLE : LIGHT EMITTING DEVICE



**ABSTRACT :** PURPOSE: To obtain a desired effective illuminance area without making the overall length longer than required, by forming both end parts of a rod-shaped lens so that its thickness becomes thinner toward its terminal.

**CONSTITUTION:** A rod-shaped lens 11 is cylindrical except both end parts so as to raise a condensing effect of both end parts, and formed so that thickness of both its end parts becomes thinner toward its terminal. As for a shape of one example thereof, both the terminals are provided with a thin end face part 11a containing the diameter of a column being parallel to a substrate, and a slant face part 11b which has been provided so as to slice off the column toward the center part from said part. As for this slant face part 11b, a part of a curved surface or a spherical surface is suitable, and its inclination is provided on 2~3 pieces of LED pellets from an LED array, although there is problem for a design related to an arrangement (interval), etc., of the LED pellets in the LED array. According to such a rod-shaped lens, as for an optical path of an emitted light of the LED pellet of the end part of the LED array, its effect becomes remarkable when a gradient  $\theta$  of the slant face is within a range of  $+20^\circ$  and  $-10^\circ$ . In this way, a drop of an illuminance distribution in both end parts of the LED array is reduced remarkably.

**COPYRIGHT:** (C)1988,JPO&Japio

SECRET